**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**
**RCRA Corrective Action**
**Environmental Indicator (EI) RCRIS code (CA750)**

**Migration of Contaminated Groundwater Under Control**

| | |
|---|---|
| **Facility Name:** | Defense Distribution Susquehanna Pennsylvania |
| **Facility Address:** | 2001 Mission Drive, New Cumberland, PA 17070 |
| **Facility EPA ID #:** | PA8213820642 |

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

X If yes - check here and continue with #2 below.

If no – re-evaluate existing data, or

If data are not available skip to #8 and enter "IN" (more information needed) status code

## BACKGROUND

### Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

### Definition of "Current Human Exposures Under Controls" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

### Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program, the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993 (GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated groundwater and contaminants within groundwater (e.g., non aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

### Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

**Migration of Contaminated Groundwater Under Control**
**Environmental Indicator (EI) RCRIS code (CA750)**

2. Is **groundwater** known or reasonably suspected to be "contaminated"[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action anywhere at, or from, the facility?

_X_ If yes – continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

_____ If no – skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

_____ If unknown (for any media) – skip to #8 and enter "IN" status code.

**Rationale and Reference(s):**

Previous groundwater investigations conducted at the Installation have identified eight distinct petroleum- and/or chlorinated-VOC groundwater plumes, which are outlined in the following table. Constituents of concern (COCs) listed on this table are based on consistent exceedances of PADEP Residential and/or Non-Residential groundwater medium-specific concentrations (MSCs) in wells from September 2004 through June 2006 as documented in Weston's groundwater summary tables (Weston, 2006b, 2006c, 2006d). These groundwater plumes are known to be the result of releases primarily from underground storage tanks, sumps, or past disposal practices.

| PLUME LOCATION | PRIMARY COCs | PADEP NON-RESIDENTIAL GROUNDWATER MSC (UG/L) | PADEP RESIDENTIAL GROUNDWATER MSC (UG/L) |
|---|---|---|---|
| SWMU Nos. 3 and 4 | TCE | 5 | 5 |
| | 1,1,2,2-TCA | 0.3 | 0.3 |
| SWMU No. 6 | PCE | 5 | 5 |
| | TCE | 5 | 5 |
| | 1,2-DCE | 70 | 70 |
| | 1,1,2,2-TCA | 0.3 | 0.3 |
| SWMU No. 17 (includes SWMU No. 2 and AOC M) | PCE | 5 | 5 |
| | TCE | 5 | 5 |
| | cis-1,2-DCE | 70 | 70 |
| | 1,1,2,2-TCA | 0.3 | 0.3 |
| | 1,1,2-TCA | 5 | 5 |
| | VC | 2 | 2 |
| SWMU No. 27 | TCE | 5 | 5 |
| | 1,2-DCE | 70 | 70 |
| | 1,1,1-TCA | 200 | 200 |
| | 1,1-DCA | 110 | 27 |
| | Carbon Tetrachloride | 5 | 5 |

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

| PLUME LOCATION | PRIMARY COCs | PADEP NON-RESIDENTIAL GROUNDWATER MSC (UG/L) | PADEP RESIDENTIAL GROUNDWATER MSC (UG/L) |
|---|---|---|---|
| SWMU No. 42 | TCE | 5 | 5 |
| | 1,1-DCE | 7 | 7 |
| | 1,2-DCE (P) | 70 | 70 |
| | VC | 2 | 2 |
| AOC N | BTEX | 11,705† | 11,705† |
| | MTBE | 20 | 20 |
| | 1,2-DCA | 70 | 70 |
| | Carbon tetrachloride | 5 | 5 |
| IRP Site 60 | PCE | 5 | 5 |
| | 1,1,1-TCA | 200 | 200 |
| IRP Site 63 | TCE | 5 | 5 |

*(P) indicates sample was collected from piezometers that monitor Marsh Run Pond both on the Installation property and across Old York Road.

†MSC listed is total of MSCs for benzene, toluene, ethylbenzene, and total xylenes.

TCE – Trichloroethene
DCE – Dichloroethene
VC – Vinyl Chloride
BTEX – Benzene, Toluene, Ethylbenzene, and Xylenes
MTBE – Methyl Tert Butyl Ether
DCA – Dichloroethane
PCE – Tetrachloroethene
TCA – Trichloroethane

Recently, DDSP identified anomalous TCE concentrations in one of the groundwater monitoring wells located in the vicinity of Building 85 (now known as IRP Site 63). Eight temporary piezometers were installed around the north and south sides of Building 85 in June 2005 to locate possible TCE source areas and to delineate the areal extent of the groundwater plume. The piezometers have been sampled quarterly since their installation. Groundwater sample results have indicated that the COCs (constituents consistently exceeding the PADEP Residential and Non-Residential groundwater MSCs) at IRP Site 63 are PCE, TCE, and 1,1,2,2-TCA. A source area has not yet been located; however, DDSP is actively investigating this area.

**Migration of Contaminated Groundwater Under Control**
**Environmental Indicator (EI) RCRIS code (CA750)**

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[1] as defined by the monitoring locations designated at the time of this determination)?

__X__ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2] )
***Yes, with caveats regarding SWMU No. 42 and IRP Site 63.

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

_____ If unknown - skip to #8 and enter "IN" status code.

**Rationale and Reference(s):**

Groundwater plumes associated with AOC N (PX Gas Station) have been contained within the limits of the Installation, and fate and transport modeling of the groundwater in this area indicates that on-Post containment of AOC N-contaminated groundwater is expected to be maintained in the future (Weston, 2004c).

Two of the chlorinated-VOC groundwater plumes (SWMU No. 6 and IRP Site 60) have been shown to be migrating off-Post beneath property owned by Pennsylvania Lines, LLC. (Norfolk Southern Railways), toward the Susquehanna River. Fate and transport modeling performed by Weston (2004b and 2004c) for TCE in groundwater at SWMU No. 6 indicates that under natural attenuation conditions, predicted TCE concentrations would fall below 5 ug/L (PADEP groundwater MSC) by 2076. The model also predicted that any groundwater recovery system configuration would not be a feasible alternative to remediate TCE in groundwater at SWMU No. 6 because of the poor yield of the aquifer underlying the area between SWMU No. 6 and the eastern Installation property boundary.

At IRP Site 60, fate and transport analyses performed by Weston (2004a) for both natural attenuation and groundwater recovery scenarios demonstrated that PCE concentrations would fall below the Residential Used Aquifer MSC by 2045 under natural conditions and by 2035 using a three-well pump and treat system. In addition, Weston demonstrated through statistical trend analysis, that since the removal of the source, the PCE groundwater plume fringe was stable and decreasing trends for TCE and cis-1,2-DCE concentrations were expected.

Based on the results of Weston's fate and transport modeling for SWMU No. 17 groundwater (2006a), TCE and 1,1,2,2-TCA concentrations were predicted to fall below the PADEP Residential Used aquifer MSCs by 2090. Statistical analysis indicated that 1,1,2,2-TCA concentrations were showing a decreasing trend near Marsh Run Pond. The model further predicted that TCE and 1,1,2,2-TCA concentrations would remain persistent in the overburden aquifer because of

[1] "Existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

the low conductivity of the aquifer, the presence of a shallow water table gradient, and the high sorption properties of the Marsh Run Pond/Creek sediments (Weston, 2006a).

Fate and transport modeling for cis-1,2-DCE in groundwater at SWMU No. 27 indicated that the groundwater recovery system operating at the time of Weston's 2003 investigation was no more effective in reducing concentrations of cis-1-2-DCE in the groundwater than natural attenuation (Weston, 2001 and 2003b). Under natural attenuation conditions, COCs in the SWMU No. 27 groundwater plume would not reach the downgradient edge of the SWMU No. 6 groundwater plume at concentrations above the PADEP groundwater MSC; furthermore, concentrations of cis-1,2-DCE in the SWMU No. 27 groundwater plume would fall below the Residential groundwater MSC by 2012. In addition, the fate and transport model predicted that the cis-1,2-DCE groundwater plume would not migrate to the Susquehanna River (Weston, 2001 and 2003b).

For groundwater at SWMU No. 42, Weston's fate and transport analysis conducted for TCE and its daughter products, cis-1,2-DCE, VC, 1,1-DCE, and 1,1,1-TCA, indicated that natural attenuation was limited nearer to the current location of the EDC building (Weston, 2003b). More rapid natural attenuation would occur closer to Marsh Run Pond sediments. According to the results of the fate and transport model, COC concentrations in SWMU No. 42 groundwater are expected to increase along the southeastern portion of Westfield Terrace, south of the EDC (Weston, 2003b).

The TCE groundwater plume associated with SWMU No. 42 has migrated beyond the western Installation property boundary and lies beneath the Westfield Terrace residential neighborhood. In addition, this groundwater plume, as well as the chlorinated-VOC plumes associated with SWMU Nos. 2 and 17, and SWMU Nos. 3 and 4, has reached Marsh Run Pond and Marsh Run Creek.

Two other groundwater plumes (i.e., groundwater plumes associated with SWMU No. 6 and IRP Site 60) have migrated beyond the Installation's property boundaries. It appears that the SWMU No. 6 and IRP Site 60 groundwater plumes have stabilized, as evidenced by comparison of groundwater plume maps, and supported by statistical trend analyses and groundwater sample data, included in quarterly groundwater monitoring reports prepared by Weston (Weston, 2006b, 2006c, and 2006d). The SWMU No. 42 groundwater plume, however, has shown increasing TCE trends in groundwater underlying Westfield Terrace and discharging to the wetlands southwest of Westfield Terrace (Weston, 2006b, 2006c, and 2006d), as was predicted by Weston's fate and transport modeling. The SWMU No. 42 TCE groundwater plume is expected to remain within the monitoring network, and DDSP's post-remedial care plan includes seven years of additional groundwater monitoring at SWMU No. 42.

Most of the plumes, including the SWMU No. 6, SWMU No. 17, SWMU No. 42, and AOC N plumes, show no significant changes in areal or vertical extent. The SWMU No. 27 plume appears to be shrinking in size over time. Contaminant fate and transport groundwater flow modeling of the IRP Site 60 plume has shown that natural attenuation of contaminants in this area will be effective in decreasing plume concentrations, with predicted future concentrations below calculated Site-Specific Standards (SSS), which are protective of Susquehanna River surface water quality criteria as well as other possible receptors (Weston, 2003a).

Based on the data, it appears as though the SWMU No. 4 plume has expanded horizontally toward the interior of the Installation (Weston, 2006b, 2006c, and 2006d); however, a new site (IRP Site 63) is currently being investigated by DDSP upgradient of SWMU No. 4. DDSP believes that the plume once associated with SWMU No. 4 may be part of IRP Site 63. It is not currently known if migration of this plume has stabilized. Relative to the newly-identified PCE and TCE plume located in the vicinity of Building 85 (IRP Site 63), based on the location of this area (northeast region of the Installation) and known hydrogeologic conditions, it is believed that impacted groundwater from this area will flow either south within the Installation or east to the Susquehanna River.

DDSP has instituted groundwater use restrictions both on and off the Installation. Use of groundwater is prohibited both on-Post (via the Installation's Master Plan) and in the neighboring development of Westfield Terrace (via Township Ordinance). All residents of that neighborhood are currently connected to the local public water supply (PA American Water Company).

Time concentration maps and plots have shown that concentrations of key contaminants fluctuate over time, but the overall configuration of the groundwater plumes have remained relatively stable (Weston, 2006b, 2006c, 2006d).

**Migration of Contaminated Groundwater Under Control**
**Environmental Indicator (EI) RCRIS code (CA750)**

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

| | |
|---|---|
| X | If yes - continue after identifying potentially affected surface water bodies. |
| _____ | If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies. |
| _____ | If unknown - skip to #8 and enter "IN" status code. |

**Rationale and Reference(s):**

The nearest surface water bodies to DDSP are Marsh Run Pond and Marsh Run Creek, which are located on Installation property, and the Susquehanna River, which bounds the Installation to the north and east.

**Migration of Contaminated Groundwater Under Control**
**Environmental Indicator (EI) RCRIS Code (CA750)**

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration [2] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

_____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgment/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

X If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate "level(s)," and if estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing. .

_____ If unknown - enter "IN" status code in #8.

**Rationale and Reference(s):**

Surface water sample results collected from eight separate locations in Marsh Run Pond and along Marsh Run Creek from March 2004 through June 2006 indicate that COCs (TCA and TCE) in groundwater have historically migrated from the Installation to these surface water bodies at concentrations above the Residential and Non-Residential groundwater MSCs (Weston, 2006b, 2006c, and 2006d). Concentrations of detected COCs exceeding the groundwater standards generally were identified during the December 2004 and March 2005 sampling event (Weston, 2006c). No Residential or Non-Residential groundwater MSC exceedances were detected in the June 2006 surface water samples (Weston, 2006c).

Groundwater samples collected from wells located in the vicinity of groundwater discharges to Marsh Run Pond and Marsh Run Creek also indicate that COCs (PCE, TCE, DCE, TCA, and VC) are discharging to Marsh Run Pond and Marsh Run Creek above Residential and Non-Residential groundwater MSCs (Weston, 2006c). The table below lists the COCs present in the sentinel wells and the ranges of concentrations detected from the March 2004 sampling event to the June 2006 sampling event (Weston, 2006c).

[2] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

**Groundwater Discharges to Marsh Run Pond and Marsh Run Creek in the Vicinity of SWMU Nos. 2, 4, and 42**

| Parameter | MSC | 10x R and NR GW MSC | 100x R and NR GW MSC | 2006 High Concentration | Range (2004 – 2006) | |
|---|---|---|---|---|---|---|
| | | | | | Low | High |
| PCE | 5 | 50 | 500 | 10.2 | 5 | 16.6 |
| TCE | 5 | 50 | 500 | ***224*** | 7.3 | ***377*** |
| TCA | 0.3 | 3 | 30 | ***4.5*** | 0.9 | ***12*** |
| DCE | 70 | 700 | 7,000 | 248 | 99.3 | 388 |
| VC | 2 | 20 | 200 | 10.4 | 2.1 | 8 |

*Concentrations are in ug/L.

As the above table shows, TCE and TCA are migrating to Marsh Run Pond and Marsh Run Creek at concentrations that are greater than 10x the PADEP groundwater MSCs; however, the COCs detected in groundwater discharging to Marsh Run Pond and Marsh Run Creek were less than 10x the PADEP groundwater MSCs during the June 2006 sampling event, except TCE. TCE was detected at a concentration exceeding the 10x rule in the area of SWMU No. 2, where shallow groundwater is entering the southeastern end of Marsh Run Pond.

Trend analyses by Weston indicate that there is an overall decreasing trend for TCE entering Marsh Run Pond and Marsh Run Creek in the area of SWMU Nos. 2, 4 and 42 (Weston, 2006c); although concentrations of daughter products (DCE and VC) are increasing. TCE concentrations appear to be increasing, however, in an isolated area of the southwestern portion of the SWMU No. 42 plume and at a sentinel well that monitors groundwater discharges from SWMU No. 2 (Weston, 2006c).

Impacted groundwater flows toward the Susquehanna River from SWMU No. 6 and IRP Site 60. The following tables list concentrations of COCs that exceeded the PADEP Residential and Non-Residential groundwater MSCs at these sites from March 2004 through June 2006 (Weston, 2006c).

**Groundwater Discharges to Susquehanna River in the Vicinity of SWMU No. 6**

| Parameter | MSC | 10x MSC | 100x MSC | 2006 High Concentration | Range (2004-2006) | |
|---|---|---|---|---|---|---|
| | | | | | Low | High |
| PCE | 5 | 50 | 500 | 7.9 | 5 | 12.3 |
| TCE | 5 | 50 | 500 | ***327*** | 7.6 | ***412*** |
| TCA | 0.3 | 3 | 30 | 17.4 | 0.3 | 18.5 |

*Concentrations are in ug/L.

**Groundwater Discharges to Susquehanna River in the Vicinity of IRP Site 60**

| Parameter | MSC | 10x MSC | 100x MSC | 2006 High Concentration | Range (2004-2006) | |
|---|---|---|---|---|---|---|
| | | | | | Low | High |
| TCE | 5 | 50 | 500 | 23.3 | 5.2 | ***54.7*** |

*Concentrations are in ug/L.

TCE historically has been detected in the groundwater at concentrations greater than 10x the PADEP Residential and Non-Residential groundwater MSCs in point-of-compliance wells monitoring SWMU No. 6 and IRP Site 60. The maximum concentration of TCE detected in groundwater at SWMU No. 6, however, exceeded the 10x rule in June 2006, and trend analyses completed by Weston in March 2006 indicated that concentrations of TCE, PCE, and TCA were increasing in the point-of-compliance wells (Weston, 2006b and 2006c). It should be noted that the area between the Installation property boundary and the Susquehanna River is owned by Pennsylvania Lines, LLC (Norfolk Southern Railways), and is currently not monitored. A deed restriction is recorded on property owned by Pennsylvania Lines where groundwater is impacted, which prohibits the use of groundwater for drinking or agricultural purposes.

In the vicinity of IRP Site 60, the maximum TCE concentration detected in June 2006 was less than the 10x rule (Weston,

2006c). In addition, trend analyses completed by Weston in March 2006 indicated that COC concentrations are decreasing at this site (Weston, 2006b). As with SWMU No. 6, the property between the Installation and the Susquehanna River is owned by Pennsylvania Lines, LLC and is not currently monitored.

No COCs are discharging to surface waters in the vicinity of the Installation at concentrations greater than 100x the PADEP groundwater MSCs.

**Migration of Contaminated Groundwater Under Control**
**Environmental Indicator (EI) RCRIS code (CA750)**

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be **"currently acceptable"** (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[3])?

X If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment[4] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of "contaminated" groundwater can not be shown to be **"currently acceptable")** – skip to #8 and enter a "NO" status, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown – skip to 8 and enter "IN" status code.

**Rationale and Reference(s):**

During their previous investigative activities, Weston performed PENTOXSD modeling per PADEP requirements to evaluate diffuse impacted groundwater flow to Marsh Run Pond, Marsh Run Creek, and the Susquehanna River.

Modeling of diffuse groundwater flow to surface waters of Marsh Run Pond and Marsh Run Creek indicated that discharge concentrations of COCs related to SWMU Nos. 2 and 17 would exceed calculated waste load allocations (WLA) (Weston, 2006a). In addition, Weston completed a site-specific evaluation for ecological receptors at these surface water bodies. For this evaluation, Weston sampled the tissue of fish inhabiting Marsh Run Pond for COCs identified at SWMU Nos. 2 and 17, and assessed the impact that the concentrations of these chemicals would have on bird species feeding from the pond. Weston concluded that the concentrations of COCs detected in the fish tissue posed minimal risk to ecological receptors (Weston, 1997).

Weston's modeling of impacted groundwater at SWMU No. 42 indicated that discharge concentrations of COCs would

[3] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[4] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

not exceed the calculated WLAs. Based on these results, Weston concluded that risk to ecological receptors in Marsh Run Pond was low (Weston, 2003c).

Weston's PENTOXSD modeling of diffuse groundwater flow from SWMU No. 6 and IRP Site 60 to the surface waters of the Susquehanna River indicated that, as expected based on its volume, discharge concentrations of COCs released from these areas do not exceed the calculated WLAs; therefore, risk to ecological receptors was considered low (Weston, 2004a, 2004b, and 2004c). As with the PENTOXSD modeling of diffuse groundwater flow from SWMU No. 6 and IRP Site 60, probable impacts to the surface waters of the Susquehanna River from IRP Site 63, if plume flow is to the east, are not expected to exceed the calculated WLAs due to the volume of the receiving waterway.

Contaminant fate and transport models prepared by Weston for impacted groundwater at SWMU No. 27 indicated that under natural attenuation conditions, the SWMU No. 27 groundwater plume would not reach nearby surface water bodies, or combine with other impacted groundwater plumes that may ultimately discharge to nearby surface water bodies (Weston, 2001 and 2003b). This same rationale was used for impacted groundwater at AOC N (2004d and 2005).

**Migration of Contaminated Groundwater Under Control**
**Environmental Indicator (EI) RCRIS code (CA750)**

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

X — If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

_____ If no - enter "NO" status code in #8.

_____ If unknown - enter "IN" status code in #8.

**Rationale and Reference(s):**

The majority of the sites identified for cleanup at the Installation have been closed under the PADEP Act 2 program. Under the post-remediation care plans approved by PADEP for SWMU No. 17, SWMU No. 27, SWMU No. 42, and AOC N, quarterly groundwater samples are collected from the associated monitoring well networks. SWMU No. 6 and IRP Site 60 are currently sampled bi-annually, as per the PADEP-approved post-remediation care plan.

Groundwater attainment monitoring is being conducted quarterly at the monitoring well networks associated with SWMU No. 2 and SWMU No. 4. According to DDSP, two final quarters (third and fourth quarters 2006) were needed before final documents may be submitted to PADEP.

Since June of 2005, groundwater samples are collected quarterly from temporary monitoring wells located in the vicinity of IRP Site 63. DDSP plans to continue quarterly groundwater sampling from this network of temporary wells until the source area is identified/delineated. Once a source area is identified/delineated, additional wells will be installed and sampled as required by PADEP Act 2 regulations.

The last quarterly/bi-annual sampling event was conducted in September 2006. The sample results are attached to this checklist, as are the locations that were sampled and that will be sampled during future events.

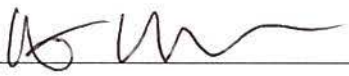
**Migration of Contaminated Groundwater Under Control**
**Environmental Indicator (EI) RCRIS code (CA750)**

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

X — YE – Yes, "Migration of contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Defense Distribution Susquehanna Pennsylvania facility, EPA ID # PA8213820642. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater". This determination will be re-evaluated when the Agency becomes aware of signification changes at the facility.

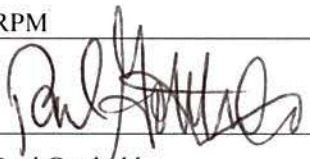
_____ NO – Unacceptable migration of contaminated groundwater is observed or expected.

_____ IN – More information is needed to make a determination.

Completed by:  Date 8/29/2017

Catheryn Blankenbiller

RPM

Supervisor:  Date 8-29-17

Paul Gotthold

Associate Director

EPA Region 3

Locations where References may be found:

A list of all reference documents are appended to the EI Report. Copies of these reference documents can be found at USEPA's Region III office in Philadelphia or PADEP's Southcentral Regional office in Harrisburg, PA.

Contact telephone and e-mail numbers:

**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**
**RCRA CORRECTIVE ACTION**
**ENVIRONMENTAL INDICATOR (EI) RCRIS CODE (CA750)**

**MIGRATION OF CONTAMINATED GROUNDWATER UNDER CONTROL**

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Weston Solutions, Inc. (1997). *RCRA Facility Investigation Phase II Report, Volume I – Technical Report.*

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# MIGRATION OF CONTAMINATED GROUNDWATER UNDER CONTROL (CA 750)